# Drinking Water

**Trevor Birkenholtz**

**Abstract** This chapter examines the ongoing global struggle to supply potable drinking water to the world's population. The chapter begins with a brief history of 20th century efforts to expand drinking water supply but argues that these efforts only resulted in partial successes. This was due to rapid demographic growth and to a dominant understanding of water scarcity as a technical problem to be solved through centralized engineering works. This paradigm is being challenged in the 21st century by an understanding of water as enmeshed in a hydrosocial cycle where social elements—including politics and economics—are intrinsic to the successful expansion of drinking water supply. Yet many issues remain, including (1) multiple kinds of water scarcity; (2) competition between different sectors; and (3) contestations surrounding cost recovery, commodification, and privatization. The chapter concludes with a discussion of water's future governance. People are no longer waiting for drinking water supplies to expand but are contesting water's meaning and engaging in participatory resistance to modes of water supply that undermine the human right to water.

**Keywords** Water scarcity · Technocratic paradigm · Commodification · Privatization · Hydrosocial cycle · Human right to water · Resistance

## Introduction: Waiting for Water

Many of the world's poorest people are waiting for water. Most of these people are in the Global South, living in Asia and Africa (UNICEF 2014). They've been waiting for 20th century modernist development to deliver on its promise of bringing safe drinking water by centralized piped networks to every home in every corner of every country of the world. But they are still waiting for this promise to

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materialize. They wait for this larger project but they also wait on a daily basis in water collection lines at public stand posts (Birkenholtz 2010), for water supplied intermittently to emerge from household taps (ibid; Loftus 2006), for water to be released into canals (Barnes 2014), and for groundwater to slowly trickle back into dug wells and tubewells (Birkenholtz 2013; Sultana 2006). This waiting disproportionately affects women, who bear the primary responsibility for ensuring household drinking needs, and children, who do much of the waiting and collection alongside their mothers (Hawkins et al. 2011; Nightingale 2011; Sultana 2009; Truelove 2011; Birkenholtz 2013). In both cases, this happens at the expense of the self-development of their other capabilities (e.g., literacy, empowerment) that come from education, employment, and the like (Sen 1999).

## Developing Drinking Water?

Drinking water is defined as potable water that is safe for household use, including food preparation and drinking. Most drinking water comes from an "improved source." An improved source is defined as rainwater, water from a well that is protected, or any water that is treated and piped into a home or public standpipe. According to the United Nations (UN), 91 % of the world's population has access to an "improved source" of drinking water (UN 2015b). Yet many improved sources in developing countries have some degree of contamination, particularly seasonally, due to heavy rains and flooding, which leads to comingling of drinking water with raw sewage from sanitation systems (UNICEF 2014). When these periodically contaminated, improved sources are taken into account, about 20 % of the world's population, mostly those living in developing countries, do not have complete access to safe drinking water (UN 2015a). This periodic contamination affects the poor the most and leads to heightened incidences of diarrheal and other water-borne diseases, particularly for vulnerable populations (i.e. children, the elderly and the malnourished) (Escamilla et al. 2013). These are ongoing issues that have long histories.

The global problem of access to safe drinking water emerged on the international development agenda in the late 1970s with the UN declaring 1981–1990 the "International Drinking Water Supply and Sanitation Decade." The project's goal was to secure safe water and sanitation for all by 1990. The project had many successes. Most notably, it improved access to water for over 715 million people (Appleton and Black 1990). In rural areas in particular, this was achieved through the development and diffusion of the India Mark 2 hand pump in the late 1970s that tapped shallow aquifers (<150 feet). Now used in countries throughout the developing world, it is a reliable community-level groundwater pump. Yet there were also many unintended consequences. One of the most glaring examples was the proliferation of these shallow hand pump tubewells in Bangladesh. These shifted the source of drinking water from surface water contaminated with fecal matter to what was thought to be safe groundwater, but in the early 1990s it was accepted that

these shallow aquifers contain high levels of arsenic and have been contaminating millions people over a longer period (Sultana 2006). So, one form of contamination was traded for another, more sinister form.

In addition to unintended outcomes such as this, the ambitious global project ultimately failed to deliver on its goals to secure water and sanitation for all for two primary reasons. First, rapid demographic growth and rapid urbanization over that period undermined countries' abilities to keep up with demand. But second, the project was based on a technocratic paradigm of water supply as an engineering problem. This approach, dominant in the 20th century, discursively and materially produced "modern water" as a way of knowing, quantifying, and representing water as a calculable physical entity, divorced from its socio-cultural contexts (Linton 2010). This understanding of water was reproduced in the offices of country-level water bureaucracies, which were largely managed by western-trained hydraulic engineers (Birkenholtz 2008; Akhter and Ormerod 2015). Ultimately, this has led to the proliferation of new modern ecological technologies (e.g., dams, treatment facilities, distribution networks, etc.) that drastically reworked existing water supply systems, sometimes in undemocratic ways. Together, the inherent goal in expanding drinking water supply was the development of centralized water supply technologies that would overcome the vagaries of nature.

In rural contexts, this incentivized people to abandon their traditional sources of drinking water supply and shift their reliance towards these new systems, which proved to be unreliable (Birkenholtz 2013). So too, in urban settings these systems have led to spatially uneven supplies that have focused on expanding supply to neighborhoods with the ability to pay to underwrite cost recovery (Loftus 2006). These efforts have evolved in tandem with the growing dominance of neo-classical economics in natural resource management that attempts to allocate water as a scarce economic good rather than as a public trust. This has systematically excluded the poor and informal areas (Truelove 2011), led to skyrocketing prices for water (Bakker 2003), and actually produced water scarcity (Loftus 2009; Birkenholtz 2010). This continues into the present period, but progress is being made both with respect to increasing access to water and on changing the way water is understood. Scholars are increasingly arguing that water is a part of a "hydrosocial cycle" where social elements, including politics and economics, are intrinsic to the circulation and provision of water (Budds 2012).

Following on the partial successes of its water decade, in 2000, the UN established the Millennium Development Goals (MGDs). The MGDs established eight "Goals" aimed at eliminating extreme poverty, globally. Goal 7 focused on "Ensuring Environmental Sustainability" and, among other objectives, attempted to halve the proportion of people without sustainable access to safe drinking water and sanitation by 2015. This specific target intersected with a second UN program: the "International Decade for Action: 'Water for Life' 2005–2015." Together, the MGDs and the "Water for Life" campaign's goals were broader than previous efforts insofar as the UN inter-agency group UN-Water was charged with the goal of helping to ensure long term sustainable management of water by coordinating between development donor agencies, countries, and water-related organizations to

ensure cooperation in meeting their water supply and management commitments. Drinking water supply development, therefore, is now embedded within broader issues of water scarcity, climate change, food security, natural disasters, healthy ecosystems, and livelihood well-being. In a way, the UN is moving towards understanding and developing water as a "hydrosocial" entity.

The UN has had many successes, but challenges remain. The MGD goal was achieved in 2010, yet 748 million still lack access to safe drinking water (World Bank 2015). So too, significant unevenness in access continues. 44 % of the population in Oceana and 32 % in Sub-Saharan Africa, for instance, do not have access to an improved drinking water source (UN 2015b). Rural-urban disparities also exist. Among UN targeted developing regions, 96 % of urban populations use improved sources, compared to 84 % of people in rural areas (ibid). 75 % of urban dwellers have access to piped drinking water, while only 33 % in rural areas enjoy the same (ibid). Today, the UN's Sustainable Development Goals (2015–2016), picks up where the MGDs left off to "ensure access to water and sanitation for all," while also focusing on water's intersection with ecosystem services, poverty alleviation and a number of other long-running development concerns (UN 2016).

Even though the UN is attempting to foster a more holistic view of water, a technocratic view of water prevails at the level of many countries' water engineering departments. This exacerbates these discrepancies, while the continued gaps in the development of centralized water supply networks is leading to (and perhaps being supported by) informal means of accessing water, including household rainwater harvesting, private water tankers, and wastewater recycling (Meehan 2013).

## 21st Century Drinking Water

The above processes continue to intersect with a number of ongoing challenges. At the beginning of the 21st century, some of the main issues surrounding drinking water include: (1) multiple kinds of water scarcity; (2) competition between urban and rural areas, and between domestic, agricultural and industrial sectors; and (3) cost recovery, commodification, dispossession and privatization, and resistance to these efforts.

Water scarcity has the potential to undermine the gains made over the last 40 years in drinking water supply development. Currently, 40 % of the global population is affected by water scarcity (UN 2015b). This percentage is expected to grow in the future due to climate change and over reliance on non-renewable supplies (UN 2015b). Scarcity can be physical (insufficient quantity or quality of supplies), economic (lack of infrastructure and/or financial means to develop water supplies), or institutional (insufficient formal or informal institutions to ensure reliable and equitable supplies). Scarcity is often a combination of these elements. For instance, as part of meeting the MDGs, the UN and its partners have promoted the use of groundwater away from surface water because groundwater is generally

less contaminated (though arsenic and fluoride continue to be an issue), readily available and easier to manage with local institutions (UN 2015b). This has resulted in regional aquifer depletion due to over-extraction, leading to new forms of scarcity. Scarcity has also been shown to be socially constructed as a rational for privatization (Kaika 2003), increasing costs to users or reallocating water towards uses that produce more capital surpluses (Mehta 2010; Birkenholtz 2016). These forms of economic and institutional scarcity also have the potential to undermine the continued expansion of drinking water supplies.

Second, this economic logic has been shown to exacerbate tensions between urban and rural drinking water supply development, leading to water grabbing by urban areas. Water grabbing is typically defined as the process through which existing users of water are dispossessed of both its use and their entitlement to it, through both legal and extra-legal means, often in tandem. As urban areas become centers of both population growth and capital accumulation, they are expanding the area over which they divert water (Brenner 2013), leading to spatially and temporally uneven rural drinking water supplies (Celio et al. 2010). Sectoral competition is also a growing issue with agriculture currently accounting for 70 % of global water withdrawals, while municipal and industrial demand is expected to increase by 50–70 % and up to 85 % in the energy sector over the next 30 years (World Bank 2016). This has led to many calls to reduce agriculture's share of water, which may have negative effects on food security.

Third, related to both of the above points, pressure from development donor agencies and cash-strapped public water utilities is resulting in the commodification of water. This is the process of using free market logics to transform water from a public good into a tradable commodity, often through the attempted establishment of private property rights over water (Bakker 2000). This is argued to result in the more economically efficient allocation of water and enhance cost recovery. These processes are leading to dispossession of access to drinking water (Swyngedouw 2005) and/or vastly increasing prices (Boelens and Zwarteveen 2005; Bakker 2001). The result is in higher prices paid by the poor for drinking water and the continued informalization of drinking water supplies.

## Resistance: Waiting on Water, Waiting on Development

These threats to the continued expansion of economically affordable drinking water have spurred people around the world to stop waiting and start resisting. They resist through formal protest movements (Harris and Roa-García 2013), informal everyday practices (Ranganathan 2014), and so-called theft (Meehan 2013). These efforts, like the hydrosocial cycle, seek to (re)place people at the center of water's future governance.

Finally, in 2010 the UN declared a Human Right to Water, recognizing that access to safe drinking water is central to the realization of all human rights (Sultana and Loftus 2012). Taken together, we are witnessing a participatory redefinition of

drinking water away from something to be managed as a "scarce natural resource" towards water as emerging from the center of competing meanings and values (Levine et al. 2013). Rather than drinking water as a subject of modern, technocratic expertise it is now the subject of constant negotiation. If the vision of "drinking water for all is to be realized," we must all participate in shaping this discussion and stop waiting.

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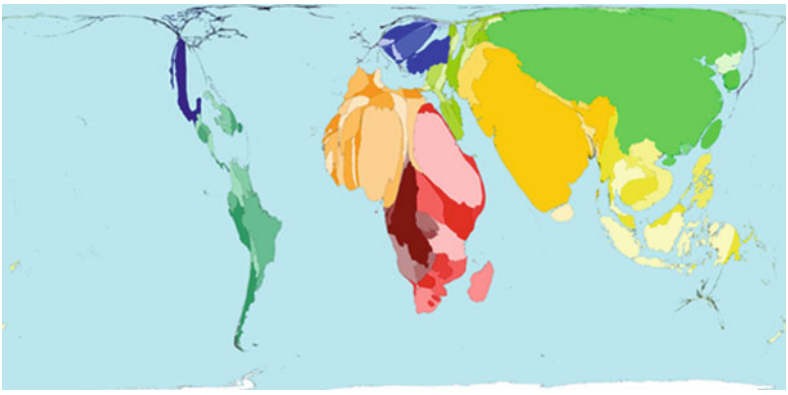
Water use. Four thousand cubic kilometers of water are used by people each year around the world, for domestic, agricultural and other industrial purposes. Whilst everybody needs water, people use hugely varying quantities. On average, people living in Central Africa each use only 2 % of the water used by each person living in North America. **Territory size shows the proportion of worldwide water use occuring there**. *Source* www.worldmapper.org. Published with kind permission of © Copyright Benjamin D. Hennig (Worldmapper Project)



Poor water. Drinking water is essential to live, but dirty drinking water is also a major cause of disease. Whilst most people living in Western Europe can access safe water, only 50 % of people living in Central Africa can do this. **Territory size shows the proportion of all people without reliable access to safe water that live there**. *Source* www.worldmapper.org. Published with kind permission of © Copyright Benjamin D. Hennig (Worldmapper Project)